

Reply to Office Action of April 3, 2006

AMENDMENTS TO THE CLAIMS

1. (Original) A low molecular weight polyphenylene ether which has a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g, and a molecular weight distribution of 1.5-2.5.

2. (Original) The low molecular weight polyphenylene ether according to claim 1, wherein the glass transition temperature (T_g) of said polyphenylene ether is represented by the following equation:

$$T_g \text{ (}^{\circ}\text{C)} > 600 \times (\eta_{sp}/c) + 105$$

3. (Original) A polyphenylene ether powder comprising the low molecular weight polyphenylene ether according to claim 1 or 2.

4. (Original) The polyphenylene ether powder according to claim 3, which has a mean particle size of 5.0-1000 μ m.

5. (Original) The polyphenylene ether powder according to claim 3, which has a mean particle size of 5.0-500 μ m.

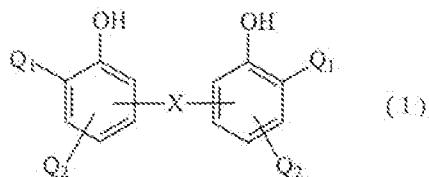
6. (Original) The polyphenylene ether powder according to claim 3, which has a mean particle size of 5.0-300 μ m.

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7. (Original) The polyphenylene ether powder according to claim 3, which has a mean particle size of 5.0-100 μ m.
8. (Original) The polyphenylene ether powder according to claim 3, which has substantially no particle having a particle size larger than 1000 μ m.
9. (Original) The low molecular weight polyphenylene ether according to claim 1, which is obtained by polymerization of a phenol compound in the presence of a catalyst and oxygen-containing gas.
10. (Original) The low molecular weight polyphenylene ether according to claim 9, wherein the phenol compound comprises a 2,6-dimethylphenol.
11. (Original) The low molecular weight polyphenylene ether according to claim 9, wherein the phenol compound is a mixture comprising 2,6-dimethylphenol and 2,3,6-trimethylphenol.
12. (Original) The low molecular weight polyphenylene ether according to claim 9, wherein the phenol compound is a mixture comprising 2,6-dimethylphenol and 2,6-diphenylphenol.

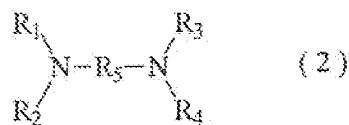
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13. (Original) The low molecular weight polyphenylene ether according to any one of claims 10–12, wherein the phenol compound further comprises a bivalent phenol represented by the following formula (1):



wherein Q₁ and Q₂ each represents either the same or a different substituent and represents hydrogen, an alkyl group, a substituted alkyl group, an aralkyl group, a substituted aralkyl group, an aryl group, a substituted aryl group, an alkoxy group, a substituted alkoxy group or halogen; X represents an aliphatic hydrocarbon residue and derivative thereof, oxygen, sulfur or a sulfonyl group; wherein each combined position of each Q₂ and X is in the ortho or para position with respect to the phenolic hydroxyl group.

14. (Original) The low molecular weight polyphenylene ether according to claim 9, wherein the catalyst comprises a copper compound, a halogen compound and a diamine compound represented by the following formula (2):



wherein R₁, R₂, R₃ and R₄ each independently represents hydrogen, a linear or branched C₁₋₆ alkyl group, with the proviso that they do not represent hydrogen at the same time; and R₅ represents a linear or methyl-branched C₂₋₅ alkylene group.

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15. (Original) The low molecular weight polyphenylene ether according to claim 14, wherein the catalyst further comprises at least one of a tertiary monoamine compound and a secondary monoamine compound.

16. (Currently Amended) A process for producing the a low molecular weight polyphenylene ether according to claim 4 having a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g, and a molecular weight distribution of 1.5-2.5, which comprises sequential the steps of:

polymerizing a phenol compound in the presence of a catalyst and oxygen-containing gas using a good solvent of said low molecular weight polyphenylene ether to obtain a polyphenylene ether solution; and

adding a poor solvent of said low molecular weight polyphenylene ether to the polyphenylene ether solution obtained by said polymerization; and

precipitating a low molecular weight polyphenylene ether having a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g by adding a poor solvent of said low molecular weight polyphenylene ether to said polyphenylene ether solution, wherein said precipitation is carried out at the temperature in the range of -80 to 20°C.

17. (Original) The process according to claim 16, wherein the poor solvent is an alcohol having 1-10 carbon atoms.

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18. (Original) The process according to claim 16, wherein the poor solvent is at least one solvent selected from the group consisting of methanol, ethanol, propanol, butanol, pentanol, hexanol and ethylene glycol.

19. (Original) The process according to claim 17 or 18, wherein the poor solvent further comprises water.

20. (Currently Amended) A process for producing the a low molecular weight polyphenylene ether according to claim 1 having a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g, and a molecular weight distribution of 1.5-2.5, which comprises the steps of:

polymerizing a phenol compound in the presence of polymerization solvent, a catalyst and oxygen-containing gas; and

precipitating said low molecular weight polyphenylene ether in the course of the polymerization,

wherein the polymerization solvent is a mixture of at least two alcohols.

21. (Original) The process according to claim 20, wherein the polymerization solvent is a mixture of at least two alcohols having 1-10 carbon atoms.

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22. (Previously Presented) The process according to claim 20, wherein the polymerization solvent is a mixture of at least two alcohols selected from the group consisting of methanol, ethanol, propanol, butanol, pentanol, hexanol and ethylene glycol.

23. (Currently Amended) The process according to claim 46—or 20, which further comprises the step of purifying a slurry comprising the precipitated low molecular weight polyphenylene ether by washing;

wherein the washing solvent is at least one solvent selected from the group consisting of methanol, ethanol, propanol, butanol, pentanol, hexanol and ethylene glycol.

24. (Original) The process according to claim 23, wherein the washing solvent further comprises water.

25. (Original) The process according to claim 23, which further comprises the step of removing the contained solvent from a washed low molecular weight polyphenylene ether by drying and devolatilization.

26 (Currently Amended) The process according to claim 46—or 20, which further comprises the steps of separating the low molecular weight polyphenylene ether from a slurry comprising the precipitated low molecular weight polyphenylene ether to obtain a wet low molecular weight polyphenylene ether, and removing the contained solvent from said wet low molecular weight polyphenylene ether by drying and devolatilization.

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27. (Previously Presented) A low molecular weight polyphenylene ether which has a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g, and a molecular weight distribution of 1.5-2.5, wherein

 said low molecular weight polyphenylene ether is obtained by a process, which comprises the steps of:

 polymerizing a phenol compound in the presence of a catalyst and an oxygen-containing gas using a good solvent of said low molecular weight polyphenylene ether;

 adding a poor solvent of said low molecular weight polyphenylene ether to the polyphenylene ether solution obtained by said polymerization; and

 precipitating a low molecular weight polyphenylene ether at the temperature in the range of ~ 80 to 20°C.

28. (Previously Presented) A low molecular weight polyphenylene ether which has a reduced viscosity (η_{sp}/c), as measured at 30°C in a 0.5g/dl chloroform solution, of 0.04-0.18 dl/g, and a molecular weight distribution of 1.5-2.5, wherein said low molecular weight polyphenylene ether is obtained by a process, which comprises the steps of:

 polymerizing a phenol compound in the presence of polymerization solvent, a catalyst and an oxygen-containing gas; and

 precipitating said low molecular weight polyphenylene ether in the course of the polymerization,

 wherein the polymerization solvent is a mixture of at least two alcohols.

29. (New) The process according to claim 16, which further comprises the step of purifying a slurry comprising the precipitated low molecular weight polyphenylene ether by washing;

wherein the washing solvent is at least one solvent selected from the group consisting of methanol, ethanol, propanol, butanol, pentanol, hexanol and ethylene glycol.

30. (New) The process according to claim 29, wherein the washing solvent further comprises water.

31. (New) The process according to claim 29, which further comprises the step of removing the contained solvent from a washed low molecular weight polyphenylene ether by drying and devolatilization.

32. (New) The process according to claim 16, which further comprises the steps of separating the low molecular weight polyphenylene ether from a slurry comprising the precipitated low molecular weight polyphenylene ether to obtain a wet low molecular weight polyphenylene ether, and removing the contained solvent from said wet low molecular weight polyphenylene ether by drying and devolatilization.